Agilent 34405A Multimeter

5.5 Digit Dual Display, Benchtop DMM More Capabilities at a Value Price

Data Sheet

Features

- **120000 counts resolution**
- **16 built-in measurement functions including temperature and capacitance**
- **0.025% DC voltage accuracy**
- **USB 2.0**
- **SCPI compatible**
- **Agilent IO Library Suite and DMM Intuilink connectivity software included**

Affordable and Feature-Rich Measurement Tool

The 34405A represents the latest member in the Agilent's DMM family and this expands Agilent's offerings in the electronics measurement tools. It provides a broad range of features and measurement functions such as DC voltage, DC current, true-RMS AC voltage and AC current, 2-wire resistance, frequency, diode test and continuity which are designed to meet general industrial needs. Furthermore, its built-in thermistor sensor is able to measure temperature ranging from -80° C to 150° C. The true value is more evident with it's capability to measure capacitance ranging from 1000pF to 10000µF. Agilent 34405A also improves efficiency and accuracy with its 6 built-in math operations: Null, dBm, dB, MinMax, Limit and Hold.

Quick Connection to the PC with USB 2.0 Interface

For those with a need to control and take preset measurements with a PC, the built-in USB 2.0 interface provides an easy and robust connection between the PC and DMM. The USB interface that is compliant with the TMC-488.2 Standards, works seamlessly with Agilent Connectivity software and can be controlled remotely via industry standard SCPI commands or through DMM Intuilink Connectivity software. IVI-COM and LabVIEW drivers are included to ensure an easy integration with different programming environments.

Bright Display, Fast Reading Speed and Configuration Storage

When high throughput and productivity are the priority, Agilent 34405A VFD dual display feature allows users to take more than one measurement and display them simultaneously on the front panel. For speed critical applications, Agilent 34405A can take up to 19 readings/sec at 4.5 digits resolution directly to the PC. In addition, the user can configure and store complete instrument setups and recall them at anytime from any of the four built-in storing states.

Rugged and Reliable

The 34405A is designed and tested according to major Safety and Regulatory Standards. In addition, the shock absorbing bumpers is designed to prevent physical damage from your day-to-day use.

Go to the WEB for more information on Agilent's DMM. Visit www.agilent.com

Agilent Technologies

DC CHARACTERISTICS [1]

FUNCTION	RANGE [2]	TEST CURRENT OR BURDEN VOLTAGE	INPUT IMPEDENCE[13]	ACCURACY ± (% of reading + % of range) 1 Year 23° C ± 5° C	ACCURACY ± (% of reading + % of range) Temperature Coefficient 0° C - 18° C 28° C - 55° C
VOLTAGE	100.000 mV	-	10.0 MΩ ± 2%	0.025+0.008	0.0015+0.0005
	1.00000 V	-	10.0 MΩ ± 2%	0.025+0.006	0.0010+0.0005
	10.0000 V	-	10.1 MΩ ± 2%	0.025+0.005	0.0020+0.0005
	100.00 V	-	10.1 MΩ ± 2%	0.025+0.005	0.0020+0.0005
	1000.0 V	-	10.0 MΩ ± 2%	0.025+0.005	0.0015+0.0005
RESISTANCE	100.000Ω	1.0 mA	-	0.05+0.008 [3]	0.0060+0.0008
	1.00000 kΩ	0.83 mA	-	0.05+0.005 [3]	0.0060+0.0005
	10.0000 kΩ	100 µA	-	0.05+0.006 [3]	0.0060+0.0005
	100.000 kΩ	10.0 µA	-	0.05+0.007	0.0060+0.0005
	1.00000 MΩ	900 nA	-	0.06+0.007	0.0060+0.0005
	10.0000 MΩ	205 nA	-	0.25+0.005	0.0250+0.0005
	100.000 MΩ	205 nA | |10MΩ	-	2.00+0.005	0.3000+0.0005
CURRENT	10.0000 mA	< 0.2 V	-	0.05+0.015	0.0055+0.0005
	100.000 mA	< 0.2 V	-	0.05+0.005	0.0055+0.0005
	1.00000 A	< 0.5 V	-	0.20+0.007	0.0100+0.0005
	10.0000 A	< 0.6 V	-	0.25+0.007	0.0150+0.0005
CONTINUITY	1000Ω	0.83 mA	-	0.05+0.005	0.0050+0.0005
DIODE TEST [4]	1.0000 V	0.83 mA	-	0.05+0.005	0.0050+0.0005

AC CHARACTERISTICS [1]

FUNCTION	RANGE [5]	FREQUENCY	ACCURACY ± (% of reading + % of range) 1 Year 23° C ± 5° C	ACCURACY ± (% of reading + % of range) Temperature Coefficient 0° C - 18° C 28° C - 55° C
TRUE-RMS AC VOLTAGE [6]	100.000 mV	20 Hz - 45 Hz	1.0+0.1	0.02+0.02
		45 Hz - 10 kHz	0.2+0.1	0.02+0.02
		10 kHz - 30 kHz	1.5+0.3	0.05+0.02
		30 kHz - 100 kHz [7]	5.0+0.3	0.10+0.02
	1.00000 V to 750.00 V	20 Hz - 45 Hz	1.0+0.1 [14]	0.02+0.02
		45 Hz - 10 kHz	0.2+0.1	0.02+0.02
		10 kHz - 30 kHz	1.0+0.1	0.05+0.02
		30 kHz - 100 kHz [7]	3.0+0.2 [15]	0.10+0.02
TRUE-RMS AC CURRENT [8]	10.0000 mA	20 Hz - 45 Hz	1.5+0.1	0.02+0.02
	100.000 mA	45 Hz - 1 kHz	0.5+0.1	0.02+0.02
	10.0000 A	1 kHz - 10 kHz [9]	2.0+0.2	0.02+0.02
FREQUENCY [10]	100 mV to 750 V	< 2 Hz	0.18+0.003	0.005
		< 20 Hz	0.04+0.003	0.005
		20 Hz ~ 100 kHz [11]	0.02+0.003	0.005
		100 kHz ~ 300 kHz [12]	0.02+0.003	0.005
	10 mA to 10 A	< 2 Hz	0.18+0.003	0.005
		< 20 Hz	0.04+0.003	0.005
		20 Hz ~ 10 kHz [11]	0.02+0.003	0.005

TEMPERATURE AND CAPACITANCE CHARACTERISTICS [1]

FUNCTION	RANGE	TEST CURRENT, etc.	ACCURACY ± (% of reading + % of range) 1 Year 23° C ± 5° C	ACCURACY ± (% of reading + % of range) Temperature Coefficient 0° C - 18° C 28° C - 55° C
TEMPERATURE	-80.0° C - 150° C	5 kΩ thermistor probe	Probe accuracy + 0.2 ° C	0.002 ° C
	-110.0° F - 300.0° F	5 kΩ thermistor probe	Probe accuracy + 0.4 ° F	0.0036 ° F
CAPACITANCE	1.000 nF	0.75 µA	2.0+0.8	0.02+0.001
	10.00 nF	0.75 µA	1.0+0.5	0.02+0.001
	100.0 nF	8.3 µA	1.0+0.5	0.02+0.001
	1.000 µF - 100,0 µF	83 µA	1.0+0.5	0.02+0.001
	1000 µF	0.83 mA	1.0+0.5	0.02+0.001
	10,000 µF	0.83 mA	2.0+0.5	0.02+0.001

[
1] Specifications are for 30 minutes warm-up, 5 1/2 digit resolution and calibration temperature 18° C - 28° C.
[2] 20% over range on all ranges except 1000Vdc.
[3] Specifications are 2-wire ohms using Math Null. If without Math Null, add 0.2Ω additional error.
[4] Specifications are for the voltage measured at the input terminals only.
[5] 20% over range on all range except 750 Vac
[6] Specifications are for sinewave inputs > 5% of range. Maximum crest factor : 3 at full scale.
[7] Additional error to be added as frequency > 30kHz and signal input < 10% of range. 30kHz ~ 100kHz: 0.003% of full scale per kHz.
[8] For 12A terminal, 10A dc or ac rms continuous, > 10A dc or ac rms for 30 seconds ON and 30 seconds OFF.
[9] For 1A and 10A ranges, the frequency is verified for less than 5kHz.
[10] Specifications are for half-hour warm-up, using 0.1 second aperture. The frequency can be measured up 1Mhz as 0.5V signal to 100mV/1V ranges.
[11] For 20Hz ~ 10kHz, the sensitivity is AC input current from 10% to 120% of range except where noted.
[12] For 100kHz ~ 300kHz, the sensitivity will be 12% ~ 120% of range except 750V range.
[13] Input Impedence is in paralleled with capacitance < 120 pF.
[14] For input < 200V rms
[15] For input < 300V rms

OPERATING CHARACTERISTICS

			SYSTEM SPEED			
FUNCTION	**DIGITS**	**READING SPEED [1]**	**FUNCTION CHANGE (sec)[2]**	**RANGE CHANGE (sec)[3]**	**AUTO RANGE (sec)[4]**	**READING SPEED OVER USB[5]**
DCV, DCI,	5 1/2	15/s	0.6	0.7	2.2	8/s
	4 1/2	70/s				19/s
ACV, ACI	5 1/2	2.5/s	5.0	2.2	6.1	1/s
	4 1/2	2.5/s				
FREQUENCY [6]	5 1/2	9/s	7.0	2.5	6.1	1/s
	4 1/2	9/s				

[1] Reading rate of the A/D converter.
[2] Time taken to change from 2-wire resistance to this specified functions and ready for new measurement using the SCPI "FUNC" and "READ?" commands.
[3] Time taken to change one range to the next higher range and ready for the new measurement using the SCPI "FUNC" and "READ?" commands.
[4] Time taken to automatically change from one measurement range to another using SCPI "CONF AUTO" and "READ?" commands.
[5] Number of measurements per second that can be read through USB using SCPI " READ?" command.
[6] Number of triggers per second that the meter could perform using SCPI "INIT" command.

SUPPLEMENTAL MEASUREMENT CHARACTERISTICS

DC VOLTAGE

Measuring Method:
Sigma Delta A-to-D converter

Input Resistance:
10MΩ ± 2% range (typical)

Input Protection:
1000V on all ranges

RESISTANCE

Measurement Method:
2wire Ohms

Open-circuit voltage:
Limited to < 5V

Input Protection:
1000V on all ranges

DC CURRENT

Shunt Resistance:
0.1Ω to 10Ω for 10mA to 1.2A ranges
0.01Ω for 12A range

Input Protection:
Front Panel 1.25A, 500V fuse for I terminal
Internal 15A, 600V fuse for 12A terminal

CONTINUITY / DIODE TEST

Measurement Method:
Uses 0.83mA ± 0.2% constant current source, < 5V open circuit voltage

Response Time:
70 samples/sec with audible tone

Continuity Threshold:
10Ω fixed

Input Protection:
1000V

TEMPERATURE

Measurement Method:
2-wire Ohms measurement of 5kΩ thermistor sensor (YSI 4407) with computer conversion
Auto-ranging measurement, no manual range selection

Input Protection:
1000V

MEASUREMENT NOISE REJECTION

CMRR (Common Mode Rejection) For 1kΩ unbalance LO lead
DC 120 dB
AC 70 dB

NMR (Nomal Mode Rejection) For 60 Hz (50 Hz) ± 0.1%
5 1/2 digits 65 dB (55 dB)
4 1/2 digits 0 dB

AC VOLTAGE

Measurement Method:
AC coupled true-rms - measure the ac component with up to 400 Vdc bias any range

Crest Factor:
Maximum 5:1 at full scale

Input Impedance:
1MΩ ± 2% in parallel with < 100pF of all ranges

Input Protection:
750V rms on all ranges

AC CURRENT

Measurement Method:
DC coupled to the fuse and current shunt, AC coupled true rms measurement (measure the AC component only)

Shunt Resistance:
0.1Ω to 10Ω for 10mA to 1.2A range
0.01Ω for 12A range

Input Protection:
Externally accessible 1.25A, 500V fuse for 1 terminal
Internal replaceable 15A, 500V fuse for 12A terminal

FREQUENCY

Measurement Method:
Reciprocal counting technique. AC coupled input using ac voltage function.

Signal Level:
10% of range to full scale input on all ranges
Auto or manual range selection

Gate Time:
0.1 second or 1 period of the input signal, whichever is longer.

Input Protection:
750V rms on all ranges

MATH FUNCTIONS

Null, dBm, dB, Min/Max/Avg, Hold, Limit Test

TRIGGERING and MEMORY

Single trigger, 1 reading memory

REMOTE INTERFACE

USB 2.0 full speed, USBTMC class device (GPIB over USB)

PROGRAMMING LANGUAGE

SCPI, IEEE-488.1, IEEE-488.2

GENERAL CHARACTERISTICS

POWER SUPPLY
100V/120V(127V)/220V(230V)/240V ± 10%
AC line frequency 45Hz - 66Hz and (360Hz - 440Hz, 100/120V operation)

POWER CONSUMPTION
16VA maximum, <11W average

OPERATING ENVIROMENT
Full accuracy at 0° C to 55° C
Full accuracy to 80% RH at 30° C (non-condensing)
Altitute up to 3000 meters

STORAGE COMPLIANCE
- 40° C to 70° C

SAFETY COMPLIANCE
Certified by CSA for IEC/EN/CSA/UL 61010-1 2nd Edition

MEASUREMENT CATEGORY
CAT II, 300V: CAT I 1000Vdc, 750Vac rms, 2500Vpk transient over voltages
Pollution degree 2

EMC COMPLIANCE
Certified to IEC/EN 61326: 2002, CISPR 11, and equivlents for Group 1, Class A

SHOCK and VIBRATION
Tested to IEC/EN 60086-2

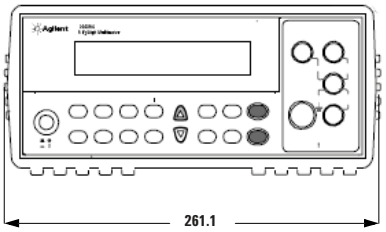
DIMENSION (HxWxD)I
Rack: 88.5mm x 212.6mm x 272.3mm
Bench: 103.8mm x 261.1mm x 303.2 mm

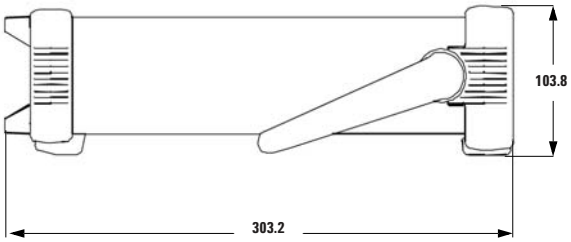
WEIGHT
3.75 kg, 8.27 lb

WARM UP TIME
30 minutes

WARRANTY
1 year

Dimensions





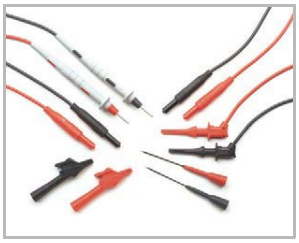
Accessories Included:

- Test Lead Kit
- Test Report
- Power Cord
- USB Interface Cable
- Quick Start Guide
- User's and Service Guide
- Product Reference CD-ROM
- Agilent IO Library Suite CD-ROM

Options:

- Opt. 1CM - Rack Mount Adapter Kit

Agilent Optional Accessories



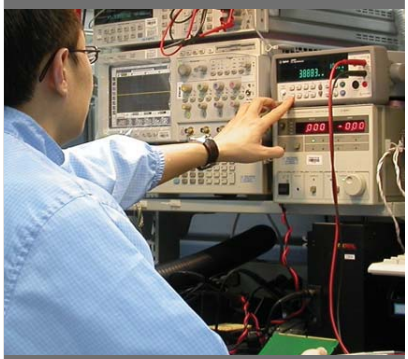
34132A Deluxe Test Lead Kits

34133A Precision Electronic Test Leads

34330A 30A Current Shunt

Experience the new 34405A Digital Multimeter.

Watch the 34405A in action on your PC by downloading the interactive demo from www.agilent.com/find/34405A.



Agilent 34405A Multimeter: Versatile and low cost solution for benchtop testing.

5.5 digit dual display increases productivity and throughput in troubleshooting.

Use the Up-Down keys to select the desired measurement range. Just press Shift -> Auto key to switch measurement range automatically.

Superior value with a broad range of functions, which includes the temperature and capacitance measurements.

Connect the supplied test leads to the Input Terminals to start your measurements.

Selecting the secondary display measurements.

Math functions and utility menu that allow users to take reference measurements (ie. Min/Max value and etc.) and store the measurement setups from the front panel.

Agilent Technologies' Test and Measurement Support, Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Phone or Fax
United States:
(tel) 800 829 4444
(fax) 800 829 4433

Canada:
(tel) 877 894 4414
(fax) 800 746 4866

China:
(tel) 800 810 0189
(fax) 800 820 2816

Europe:
(tel) 31 20 547 2111

Japan:
(tel) (81) 426 56 7832
(fax) (81) 426 56 7840

Korea:
(tel) (080) 769 0800
(fax) (080) 769 0900

Latin America:
(tel) (305) 269 7500

Taiwan:
(tel) 0800 047 866
(fax) 0800 286 331

Other Asia Pacific Countries:
(tel) (65) 6375 8100
(fax) (65) 6755 0042
Email: tm_ap@agilent.com

Contacts revised: 05/27/05

Printed in USA, April 15, 2006
5989-4906EN

Agilent Technologies